cent. of medium or marked reaction were given for the most part by children over two years of age nourished on a mixed diet.

The conclusion from these results is that the indican reaction in the urine is more positively connected with anomalies of digestion, especially in mixed feeding, than with the principal malady. Consequently indican has no other diagnostic importance than that of indicating the degree of decomposition of albuminoid substances in the intestines.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

JOHN SLADE ELY, M.D.,

PROFESSOR OF PATHOLOGY IN THE WOMAN'S MEDICAL COLLEGE OF THE NEW YORK INFIRMARY; ASSISTANT IN PATHOLOGY IN THE COLLEGE OF PHYSICIANS AND SURGEONS; PATHOLOGIST TO BELLEVUE HOSPITAL.

IMMUNITY: NATURAL AND ARTIFICIAL.

THE recent development of our ideas regarding immunity is traced in an interesting paper by BUCHNER, read before the Eighth International Congress of Hygiene and Demography at Buda-Pesth (*Münch. med. Woch.*, 1894, Nos. 37 and 38), in which the essential differences between the natural immunity of certain animals to bacterial influences and the immunity artificially conferred by experiment are emphasized. The elaborate argument embodying the results of the investigations of the past three years is summed up in the following conclusions:

1. The natural power of resisting infection, the so-called natural immunity, depends upon distinctly different conditions and causes from the artificially induced immunity. They are, therefore, essentially different conditions, which, from the scientific standpoint, should be kept quite distinct from one another, and investigated each for itself, although practically they may be coexistent in the same individual.

2. Natural immunity depends, on the one hand, on the bactericidal action of certain substances in solution in the organism, the so-called *alexines*, or, on the other hand, on an inherited insusceptibility of the tissues and cells of the body to the several bacterial poisons. This natural immunity cannot, as a rule, be transmitted to the body of another animal by means of the blood.

3. The leucocytes play an important rôle in the protection of the body by natural immunity, not as phagocytes, but through the action of soluble substances secreted by them. Phagocytosis is only a secondary function.

4. Artificial or acquired immunity depends on the presence of modified specific bacterial products, the so-called *antitoxines*, either in the blood, in the tissues, or in both. By transfer of the blood these specific antitoxines can be transmitted to another organism, thereby conferring upon it artificial immunity.

5. The action of the antitoxines does not depend upon destruction of the specific bacterial poisons by contact with them, but occurs only in the animal

body and by its participation. By the presence of the antitoxines a lower degree of susceptibility of the living cells of the body to the specific toxines of the bacteria is in some way induced, thereby rendering the body as a whole resistant to the action of those poisons.

Two New Fixatives.

The following fixing solution is highly recommended by **Zenker** (*Münch. med. Woch.*, 1894, No. 27, 532), who claims for it all the advantages of the vastly more expensive Flemming and Hermann fluids:

Distilled water	100
Corrosive sublimate	5
Potassium bichromate	2.5
Sodium sulphate	1
Glacial acetic acid	5

It is best to add the acetic acid shortly before using; the remaining ingredients may be mixed and kept on hand indefinitely.

This fixative combines the advantages of sublimate and Muller's fluid fixation, the finer details of both nuclei and cell-bodies being admirably preserved. There is no shrinkage of the tissues, which stain well by all the usually employed methods, including those for the bacteria, and imbed well in celloidin or paraffin.

Small cubes of tissue about one cubic centimetre in volume are immersed in the fixative for twenty-four hours, are washed thoroughly in water, and are afterward hardened in alcohol of increasing strength, any traces of sublimate which may remain in the tissues being at the same time removed by the addition of a little tincture of iodine to the alcohol.

The cost of a litre of this fluid is less than fifteen cents.

The other recently-suggested fixative is a substance lately introduced into commerce under the name *formalin* or formol. Its exact chemical composition is disputed, but it is commonly stated to be a 40 per cent. aqueous solution of formic aldehyde. In 1893 this was suggested as a valuable fixative for animal tissues by Blum, and has since found many advocates.

A very thorough investigation of its qualities has recently been made by **Reimer** (*Fortschr. d. Med.*, 1894, xii., Nos. 20 and 21), at the suggestion of Professor Eberth, as the result of which it is recommended by him as an almost ideal fixative. It was used in 4 and 10 per cent. solutions, between which the results showed little choice. Its penetration was greater than that of any of the other fixatives with which it was compared (alcohol, sublimate, and Hermann's fluid), no perceptible shrinkage occurred, both nuclei and cell-bodies were well preserved, and the tissues stained brilliantly by the ordinary methods and by those for the bacteria. While immersion for twenty-four hours in the formalin solutions was sufficient to thoroughly fix even comparatively large portions of tissue, no injury resulted from a much longer soaking. The specimens may then be washed in water or dropped immediately into alcohol, the exact strength of which is immaterial, specimens placed immediately in absolute alcohol yielding as good results as those placed first in weaker. In 4 per cent. solution, formalin costs about twelve cents a quart.